

PIRATA FR 27 CRUISE

PIRATA maintains 18 buoys in the Tropical Atlantic; this induces yearly dedicated cruises ensured by Brazil, US and French partners. France is in charge of 6 meteo-oceanographic moorings (at 23°W-0°N, 10°W-0°N, 0°E-0°N, 10°W-6°S, 10°W-10°S, 8°E-6°S) and 3 currentmeter (ADCP) moorings (at 23°W-0°N, 10°W-0°N and 0°E-0°N; this last one added in 2016 in the frame of the PREFACE EU programme). The last French PIRATA cruise (PIRATA FR27) has been carried out from February 25th to April 3rd, 2017, from Mindelo (Cabo-Verde), onboard the R/V THALASSA.

This year 2017 is the 20th anniversary of the PIRATA program; the vessels planning hazard made feasible the meeting between the French R/V THALASSA and the US R/V RON BROWN on March 3rd at 23°W-0°40S, as the French and US PIRATA cruises were almost simultaneous... This was a nice gift!

During this PIRATA FR27 cruise, the French PIRATA group notably ensured:

- The servicing of the PIRATA/PREFACE meteo-oceanographic buoy at 6°S-8°E, off Congo, that is also a commitment of PIRATA-FR toward PREFACE (MS8). There, the ATLAS system has been replaced by a new PIRATA T-Flex system, and a new CO₂ parameters sensor has also been added, in the context of the WP3.5 of the AtlantOS EU programme.
- The servicing of the ADCP mooring at 10°W-0°N; two years current measurements were successfully acquired from its previous deployment in March 2015. The ADCP mooring at 0°E-0°N will be serviced in 2018. The 23°W-0°N was serviced in October 2016 during a GEOMAR cruise and will be also serviced in 2018.

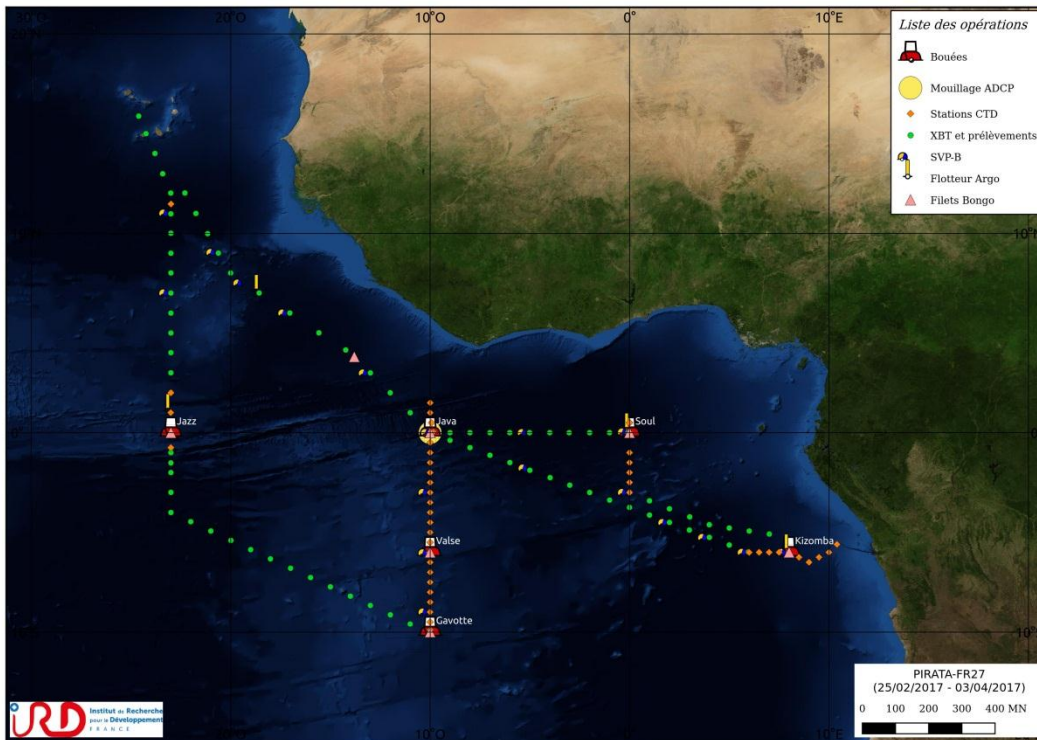
During this PIRATA FR27 cruise, the French PIRATA group also ensured:

- The servicing of 2 other T-Flex sites at 23°W-0°N and 10°W-10°S, along with the 3 other ATLAS sites at 0°E-0°N, 10°W-6°S, and 10°W-0°E.
- The servicing of the CO₂ parameters sensor installed at 10°W-6°S from 2006 (also component of the AtlantOS WP3.5; PI: Nathalie Lefèvre).
- The deployment of 11 surface drifting buoys (SVP-B), as contribution of Meteo-France to the AtlantOS WP3.6 (PI: Paul Poli), and 10 other SVP-B of NOAA/AOML as contribution to the NOAA's Global Drifter Program.
- The deployment of 7 ARGO profilers (also as contribution of ARGO/CORIOLIS to AtlantOS); five of them are with Iridium transmission and double programming (so allowing some profiles every two days during three months from the surface down to 500m or 1000m depth), two of them also measuring O₂ and deployed off Congo.
- The servicing of turbulence sensors (Xpods), installed from 2014 at 23°W-0°N and 10°W-0°N (5 on each mooring between 20m and 80m) (collaboration with Oregon State University, Corvallis, USA ; PI: Jim Moum).
- The servicing of acoustic receivers (OTN), installed from 2014 at the PIRATA buoys (one per site) (collaboration with Dalhousie University, Halifax, Nova Scotia, Canada ; PI: Frederick G. Whoriskey).
- 48 CTDO₂-LADCP profiles (from the surface down to 2000m depth; so useful for ARGO profilers validation) every ½° (latitude/longitude) along 23°W, 10°W (done yearly), 0°E,

and 6°S (around the buoy at 6°S-8°E). Data transmitted in quasi-real time to CORIOLIS for operational centers.

- 87 temperature profiles (XBT) during transits. Data transmitted in quasi-real time to CORIOLIS for operational centers.
- About 600 sea water samplings (at the surface and during CTDO₂/LADCP profiles) to analyze salinity, dissolved oxygen, nutrients, carbon parameters (DIC et TA) and primary production (Chlorophyll pigments).
- Acoustic measurements (EK60 sounders: 6 vertical and one transversal) all along the trackline of the vessel and 12 plankton samplings (from the surface down to about 200m) with a « Bongo » net at the buoys locations.
- Continuous measurements, all along the trackline, of the sea surface temperature and salinity with the thermosalinograph, horizontal currents with ADCPs, fluorimetry and meteorological parameters.
- Also, some Sargassum algae, often encountered off West Africa within eastward flows, have been sampled (for taxonomy, biological & possibly microplastic analysis). A large area of Sargassum has been crossed, on which a large amount of plastic objects was observed... a recent phenomenon in the tropical Atlantic that deserves specific analysis!

Bernard Bourlès, onboard the R/V Thalassa, April 3rd, 2017.



Trackline of the PIRATA FR27 cruise along with CTD_{O₂}/LADCP & XBT profiles & buoys and profilers deployment positions (Courtesy: P.Rousselot, IRD).



Deployment of a new T-FLEX buoy equipped with CO₂ parameters sensor at 8E-6°S (Courtesy: B.Bourlès, IRD).



Deployment of a Surface Velocity Profiler equipped with a Barometer (Courtesy: B.Bourlès, IRD).



The R/V Thalassa as seen from an ATLAS buoy before its recovery, at 0°E-0°N (Courtesy: B.Bourlès, IRD).



A Sargassum raft as observed from the R/V Thalassa around 4°N-14°W, covered with plastic objects (Courtesy: F.Marin, IRD).